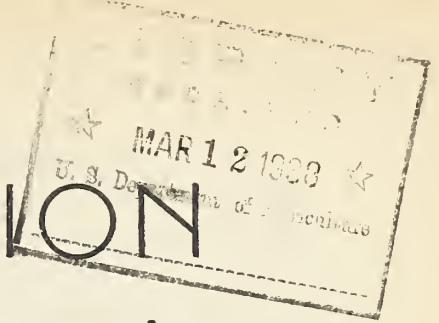
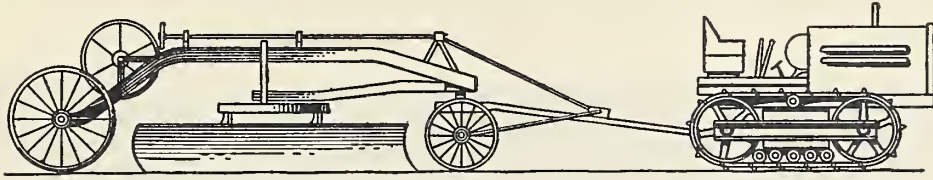


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CONSTRUCTION



HINTS

UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE
WASHINGTON, D. C.

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No. 3

"The Good and the Bad
in
Truck Trail Construction"

The material comprising this issue of "Construction Hints" was made up and distributed by Region 6.

It is an excellent contribution and should make a worthwhile reference number.

Copy of this kind is more than welcome. If you have the material, arrangements for similar issues can be made at any time.

(over)

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION

THE GOOD AND THE BAD IN TRUCK TRAIL CONSTRUCTION



FINISHED ROAD, 1937 STANDARD



TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION

- CLEARING -



NOTICE THE OVERHANGING BRUSH AND TREES



CLEARING WELL BACK ALONG BOTH SIDES OF ROAD.

STANDARD CLEARING AT TIME OF CONSTRUCTION REDUCES MAINTENANCE COSTS.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION

SWITCHBACKS



A LOADED FIRE TRUCK WILL HAVE DIFFICULTY ON THIS SWITCHBACK



GOOD ALIGNMENT & LIGHT GRADES MAKE DRIVING SAFE AND EASY: CUT DOWN EROSION AND MAINTENANCE COSTS.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



BANK SLOPING
LIKE THIS

OR

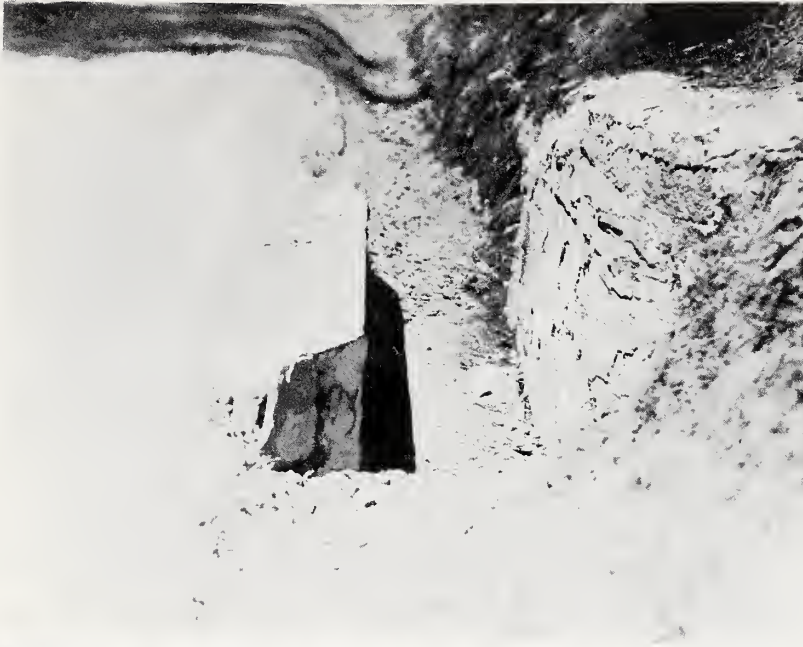


LIKE THIS,
FOR LOW COST
OF FUTURE
MAINTENANCE
AND THE FOREST
VISITOR TO SEE.

FIG. 401, PARAGRAPH "G", PAGE 402, T. T. HANDBOOK, GRAPHS THIS DESIRABLE PRACTICE WHICH MAKES ATTRACTIVE ROADSIDES, PREVENTS EROSION AND REDUCES FUTURE MAINTENANCE COSTS.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



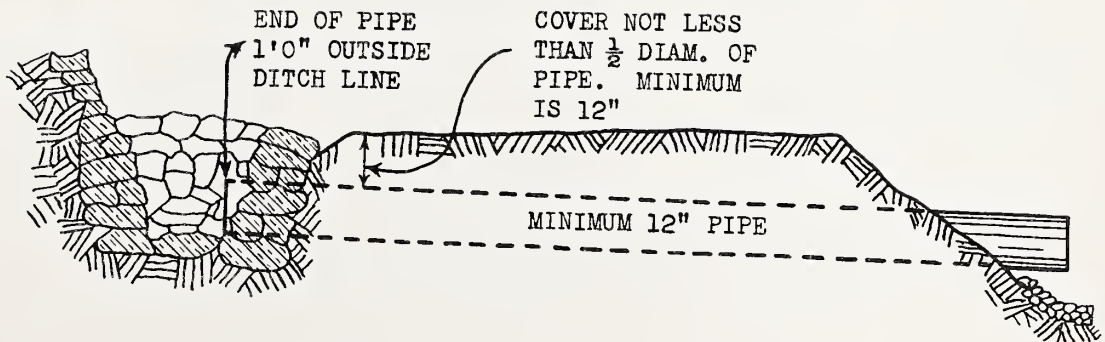
THIS IS A WELL
CONSTRUCTED
CATCH BASIN.

BUT



A BASIN WELL
OUTSIDE THE
LINE OF MAIN-
TENANCE MA-
CHINERY OR
ROAD USE IS
PREFERABLE.

GOOD PRACTICE



TRUCK TRAIL CONSTRUCTION STANDARDS

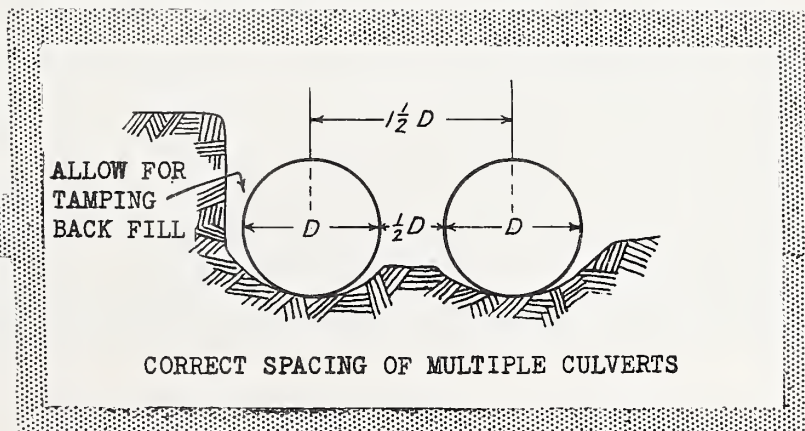
NORTH PACIFIC REGION



IF ON ACCOUNT OF
LOW FILLS IT IS
NECESSARY TO IN-
STALL MULTIPLE
CULVERTS, DO NOT
SEPARATE THEM AS
WAS DONE HERE.



BUT SPACE
THEM AS
SHOWN HERE



REMINDER: ALWAYS CHECK COST AND CAPACITY OF MULTIPLE INSTALLATIONS AGAINST ONE LARGER CULVERT.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION

DRAINAGE



LACK OF CROSS DRAINAGE CAUSES ROAD BED & ROAD SIDE EROSION



GOOD DRAINAGE PRESERVES ROAD BED & LANDSCAPE

TRUCK TRAIL CONSTRUCTION STANDARDS
NORTH PACIFIC REGION



DO YOU LEAVE
YOUR CULVERTS
LIKE THIS?



OR PROVIDE FOR
A PERMANENT
JOB LIKE THIS?

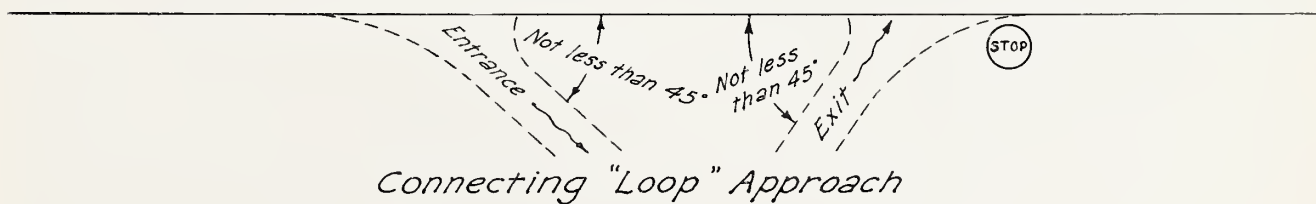
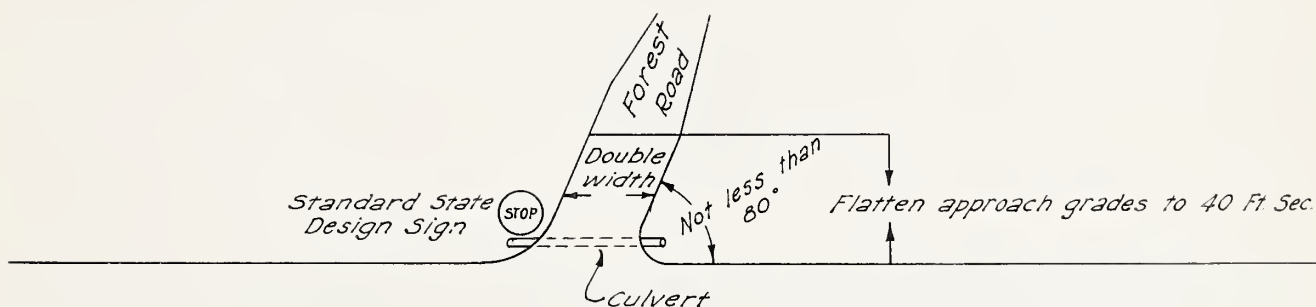
TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



SKILLED USE OF A ROCK BLADE IN BOULDER SECTIONS PAYS A DIVIDEND
FROM ROAD CONSTRUCTION COSTS BY SAVING MACHINERY AND UNNECESSARY
OR WASTEFUL DIRT MOVING.

INTERSECTIONS



R. D. & R. I. SIGN POSTING AS PER SIGN HANDBOOK

TO PROVIDE THE MAXIMUM OF SAFETY, APPLY TO ALL INTERSECTIONS THE FOLLOWING STANDARDS.

1. 300 FEET SIGHT DISTANCE FROM A POINT AT LEAST 20 FT. FROM L OF NEAR LANE OF HIGHWAY.
2. APPROACH GRADES TO HAVE A FLAT SECTION OF 40 FT. SO CARS CAN STOP ON LEVEL.
3. WHERE LOOP APPROACHES WITH TWO CLOSE CONNECTIONS ARE REQUIRED, EACH INTERSECTION ONE-WAY TRAFFIC ONLY, WITH ANGLE OF INTERSECTION NOT LESS THAN 45 DEGREES.
4. TEE TYPE INTERSECTION SHOULD HAVE ANGLE NOT LESS THAN 80 DEGREES AND TWO WAY WIDTH FOR AT LEAST 40 FT. FLAT SECTION.
5. "STOP" SIGNS OF STATE STANDARD DESIGN ON ALL HIGHWAY INTERSECTIONS.
6. DRAINAGE MUST BE SATISFACTORY TO HIGHWAY ENGINEER.
7. INTERSECTION PLANS TO HAVE APPROVAL OF HIGHWAY ENGINEER BEFORE CONSTRUCTION.



BERM ALONG SHOULDER WILL KEEP WATER ON ROADBED.



NO BERM ALONG SHOULDER TO CONFINE WATER ON ROADBED.



TREES LEFT IN SHOULDER INTERFERE WITH MAINTENANCE. DEEP NARROW DITCHES DECREASE DRIVEABLE WIDTH IN DRY WEATHER AND ARE EXPENSIVE TO MAINTAIN.



NOTE FLAT DITCHES.

EASILY AND SATISFACTORILY MAINTAINED. AMPLE DRIVING WIDTH. HOWEVER TREES MARKED X SHOULD HAVE BEEN REMOVED TO IMPROVE ALIGNMENT



NO SLOPE STAKES.
UNDERMINING TO GET
WIDTH. RESULT:
RUGGED SLOPE AND
HIGHER COST.



SLOPE STAKES.
MACHINE GETS ON
TOP OF WORK.
RESULT: A GOOD
MACHINE MADE
BANK AT LOW
COST.



SET SLOPE STAKES WHEREVER NECESSARY. START THE INITIAL CUT
RIGHT WITH TRAIL BUILDER, THEN WORK TO GRADE BY SUBSEQUENT OFF-
SETS FOR PROPER SLOPE. MINIMIZE ALL HAND LABOR, USE MACHINERY
AS FAR AS PRACTICABLE.



SUMMER TIME WITH SUNSHINE. APPARENTLY NO CROSS DRAINAGE IS NEEDED.



SUMMER TIME, A HEAVY RAIN AND WE OFTEN HAVE THIS. WHAT IS THE ANSWER?



FIVE CURVES.
COUNT 'EM!



GOOD ALIGNMENT
IS MORE DESIRABLE



"SNAKY" ALIGNMENT IN MANY CASES INDICATES THAT IN BOTH LOCATION AND CONSTRUCTION, HORIZONTAL CURVATURE HAS NOT BEEN GIVEN DUE CONSIDERATION.



THIS ROAD WILL SOON BE A DITCH BECAUSE OF NARROW CLEARING
AND INSUFFICIENT ROADBED WIDTH.



PLENTY OF WIDTH TO KEEP ROADBED BUILT UP WITH BLADE MAINTENANCE.



SLOPED BANKS AND ADEQUATE DRAINAGE WOULD DO MUCH TOWARDS PRESERVING THIS GOOD ROADBED.



WITH WEATHERED OR SELF SLOPED BANKS A ROADBED WILL ASSUME THIS APPEARANCE



THE SWITCHBACK

VS.

THE "RETURN BEND"



TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



WHAT
HAPPENED
HERE

COULD
NOT
OCCUR



WITH THIS
TYPE OF
CONSTRUCTION

REDUCE FUTURE MAINTENANCE COSTS BY SAFE, SOUND
AND CAREFUL CONSTRUCTION OF ALL STRUCTURES.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



WITH A PROPERLY INSTALLED OPEN TOP CULVERT THIS
WORK WOULD NOT HAVE TO BE DONE IN THE SPRING.



TRUCK TRAIL CONSTRUCTION STANDARDS

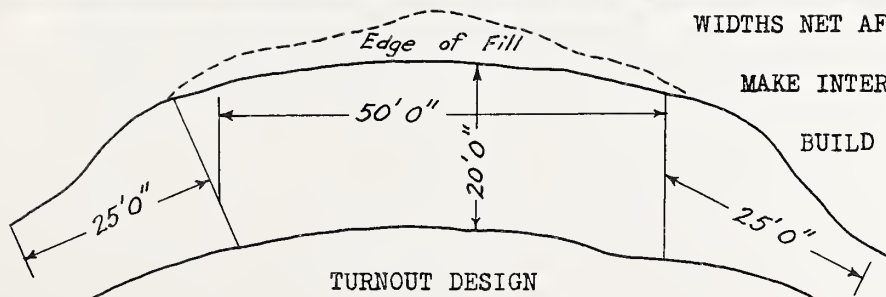
NORTH PACIFIC REGION



DO YOUR
TURNOUTS
LOOK
LIKE THIS?



OR LIKE THIS



WIDTHS NET AFTER SETTLEMENT.

MAKE INTERVISIBLE.

BUILD DURING CONSTRUCTION.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



SURFACED ROAD, NO BINDER



SURFACED ROAD, WITH BINDER

GRAVEL OR CRUSHED ROCK WILL NOT BIND

WITHOUT THE USE OF FILLER.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION

A GOOD
SECTION
BUT
CLEARING
COULD BE
IMPROVED



AND THE
STUMP WILL
CATCH A
GRADER BLADE



THE CLEARING AND BANKSLOPING IS GOOD BUT THE
FINISHED GRADE IS TOO NARROW FOR SURFACING.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION

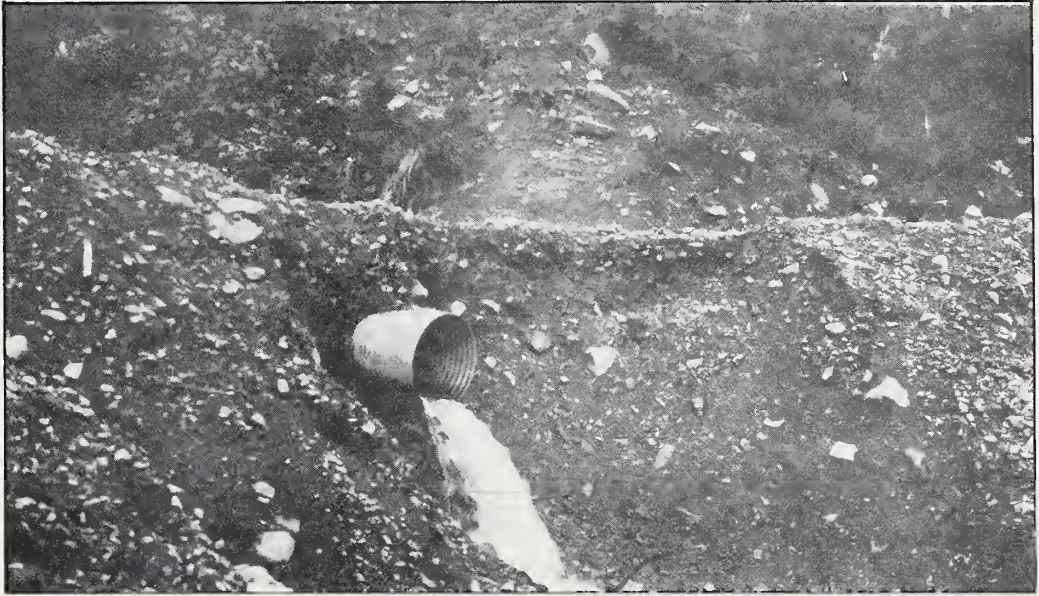


↑ THIS TRUCK TRAIL
PLUS RIPPER - ROCK BLADE - GRADER USE
GIVES THIS RESULT ↓



TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



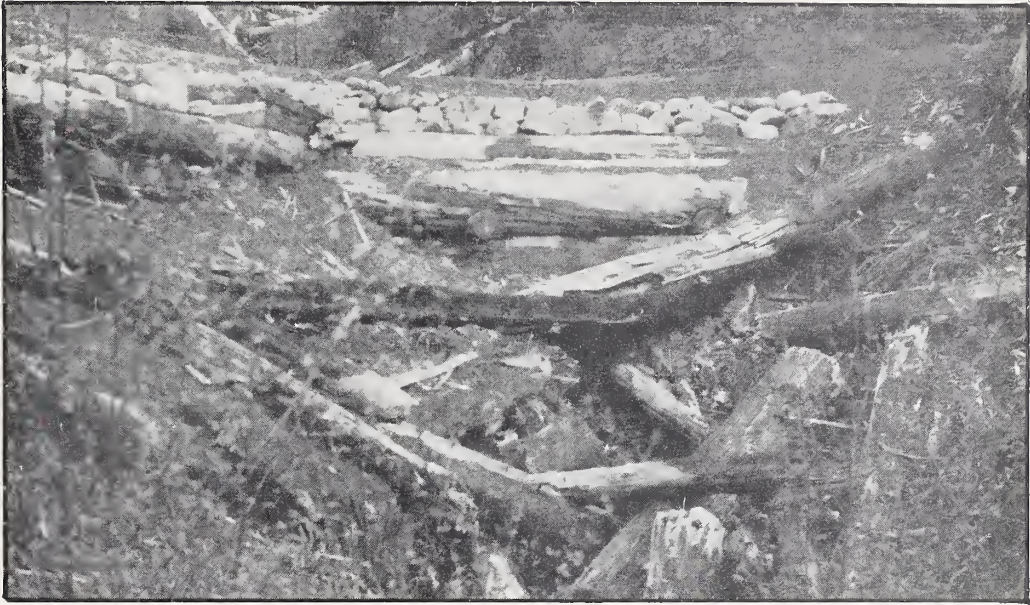
THIS CONDITION MIGHT HAVE BEEN PREVENTED.



BY THIS HEAD WALL CONSTRUCTION.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



THIS IS THE ANSWER TO THE FIRE BUG'S PRAYER. FOR APPEARANCE, CHANNEL IMPROVEMENT AND FIRE PROTECTION THOROUGHLY CLEAN UP DEBRIS AROUND BRIDGES AND CULVERTS.



FUTURE MAINTENANCE COST AGAINST THIS POORLY CONSTRUCTED AND INSTALLED CULVERT MAY BE HIGHER THAN THE ORIGINAL COST OF CONSTRUCTION.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



NOTE RUT WASH AND SCOUR ABOVE CULVERT AND NONE BELOW.



RUT WATER MUST BE CONTROLLED AND DIVERTED ON HEAVY GRADES OF NEW ROADS BEFORE DRAINAGE RESULTS. UNTIL DIRT ROADS "SET" UP, USE OF OPEN TOP CULVERTS IS RECOMMENDED FOR SURFACE DRAINAGE.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



LOOSE STUMPS AND LOGS LEFT ON UPPER BANKS
CAUSE SLIDES, UNNECESSARY OBSTRUCTIONS TO
TRAFFIC AND HIGH MAINTENANCE COSTS.



MAINTENANCE COSTS WILL BE LIGHT. NO OVERBURDEN
TO SLIDE INTO ROAD. ROADSIDE CLEANUP BELOW ROAD
COULD BE IMPROVED, HOWEVER.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



SNAGS AND A NARROW ROAD -

AND

SIMILAR ROAD WITH SNAGS FELLED



TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



SURFACE WATER NOT DRAINED AWAY, ROAD NOT CROWNED AND SOFT SPOTS WILL DEVELOP IN EVEN THE BEST OF SURFACED ROADS.



NOTE THE EVIDENT PERFECT DRAINAGE BY MEANS OF CROWN AND DITCH ON THIS ROAD SECTION.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



POOR DRAINAGE PLUS A WATER POCKET EQUALS A BIG BAD SOFT SPOT. NOTE THE CURVE BUILT BY TRAFFIC TO GET AROUND IT.



BUILD THEM RIGHT, DRAIN THEM RIGHT
AND THEY WILL LOOK AND WEAR RIGHT.

TRUCK TRAIL MAINTENANCE STANDARDS

NORTH PACIFIC REGION



A LIGHT SOIL, STRAIGHT BLADE MAINTENANCE, PLUS WIND EROSION PRODUCED THE TRENCH CONDITION SHOWN. CAN BE PREVENTED BY RIPPING, RESHAPING TO A LOW CROWN SECTION AND THEN CROWNING THE MATERIAL BACK EACH YEAR BY BLADE OR DRAG MAINTENANCE.



TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION

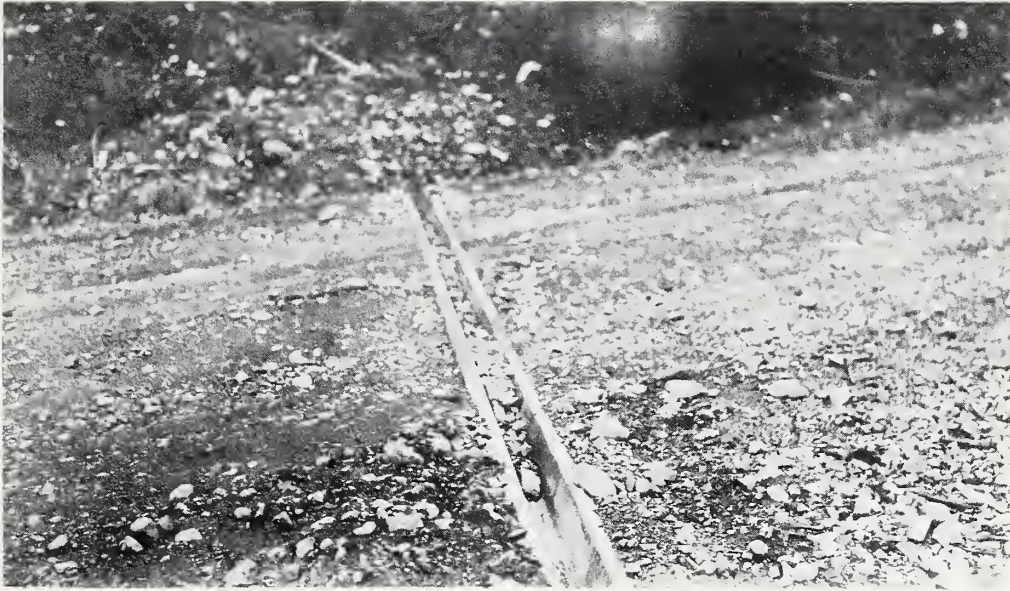


LEAD IN DITCHES, CATCH BASINS AND HEAD WALLS PAY.



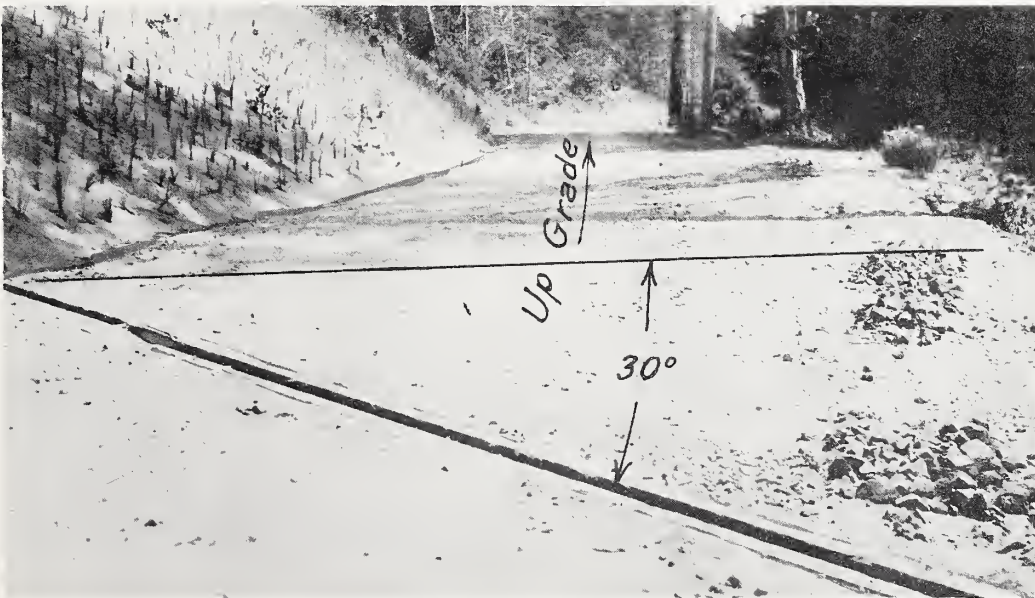
TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



INCORRECT
INSTALLATION

WHETHER METAL OR WOOD IS USED, ONE OF THESE OPEN TOP CULVERTS WILL DRAIN SURFACE RUT WATER MORE EFFICIENTLY THAN THE OTHER.



CORRECT
INSTALLATION

WHEN USED THEY SHOULD BE SET AT AN ANGLE OF APPROXIMATELY 30° WITH ROAD AND ON GRADE OF NOT LESS THAN 8%. WHERE NECESSARY FILL SLOPE MUST BE PROTECTED BY APRON CONSTRUCTION.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



GOVERNING CIRCUMSTANCES MADE THIS MEADOW LOCATION A NECESSITY. HOWEVER, IT IS RECOMMENDED PRACTICE IF POSSIBLE, TO SKIRT SUCH LAND. ADDED DISTANCE CAN USUALLY BE JUSTIFIED IN AVOIDANCE OF DRAINING MEADOW LAND, OR BREAKING WATER TABLE LEVEL, OR THE START OF EROSION AND ALSO BY SECURING A MORE SERVICEABLE ALL YEAR ROAD.



TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



EROSION
HAS SPOILED
THIS WHOLE
FINISHED
SLOPE



PLANTING
WILL HELP
TO
STABILIZE
THIS ONE

LARGE SAVINGS IN FUTURE MAINTENANCE COSTS CAN OFTEN
BE EFFECTED BY CHEAPLY TRANSPLANTING NATIVE GRASSES,
CREEPERS OR LOW SHRUBS TO RETARD AND CONTROL SLOUGH.

TRUCK TRAIL CONSTRUCTION STANDARDS

NORTH PACIFIC REGION



THIS
TURNPIKE
IS
PROPERLY
SHAPED



THIS
TURNPIKE
IS NOT

DRAINAGE IS ONE OF THE PRINCIPAL REASONS FOR TURNPIKING. IT SHOULD BE BUILT TO THOROUGHLY DRAIN THE ROADBED, BUT DITCHES SHOULD BE SHALLOW AND REGULAR, PERMITTING USE OF FULL WIDTH IN DRY WEATHER FOR PASSING AND ALLOWING EASY AND LOW COST MACHINE MAINTENANCE.

